Location: QA Officer's Office
SOP Files
Wet Chemistry Laboratory

1.0 SCOPE

1.1 This SOP is applicable to drinking, surface, and saline waters. This procedure is based on method by HACH which states not approved for EPA reporting.

2.0 SUMMARY OF THE METHOD

2.1 This SOP is an spectrophotometric procedure for evaluating Turbidity in liquid samples.

3.0 INTERFERENCES

3.1 Presence of floating debris and coarse sediments that settle out rapidly will give low readings. Finely divided air bubbles will affect results in a positive manner.

4.0 APPARATUS AND MATERIALS

4.1 100 mL volumetric flask
4.2 Hach DR/3000 Spectrophotometer
4.3 2 clean cuvettes
4.4 Parafilm
4.5 Pipettes
4.6 Volumetric Flask

5.0 REAGENTS

5.1 Deionized (DI) water
5.2 Hydrazine Sulfate
5.3 Hexamethylenetetramine

6.0 SAMPLE HANDLING AND PRESERVATION

6.1 Turbidity is best analyzed as soon as possible from the time the sample is collected. Maximum holding time is 48 hours refrigerated at 4±2^{o}C.
6.2 Samples must be provided in unpreserved, clear plastic bottles.

7.0 PROCEDURE

7.1 Preparation of Standard Solution
- 7.1.1 Stir together 10.0 mL DI Water, 0.500 g Hydrazine Sulfate and 0.050 g Hexamethylenetetramine in a 100 mL volumetric flask until all particles are dissolved in the water.
- 7.1.2 Seal tightly with parafilm and leave it sit in a protected place overnight.
- 7.1.3 Bring standard solution to 100 mL before use.

7.2 Color Development and Measurement
- 7.2.1 Select the stored program for Turbidity by pressing 5 and 9 with the numeric keys and the Stored Program key then press enter.
- 7.2.2 Turn the wavelength dial to 450 nm.
- 7.2.3 Place 25.0 mL of sample in a 25 ml cuvette. If the sample is highly colored, dilute as needed. The upper limit for this analysis is 660 Formazin Turbidity Units (FTU).
- 7.2.4 Prepare a Blank by putting 25.0 mL of DI water in another cuvette.
- 7.2.5 Place the Blank in the spectrophotometer so as the 25 mL mark faces forward. Close the light shield.
- 7.2.6 Press the ZERO and then CONC keys. The spectrophotometer is zeroed for the analysis.
- 7.2.7 Place the sample into the cell holder and close the light shield. Results will be displayed in Formazin turbidity units (FTU).

8.0 QUALITY CONTROL

8.1 See Table 1

8.2 Samples are analyzed in batches of 20 or less per QC set. The QC samples that are analyzed per batch are:

- Standard Check
- LCS
- MS
- DUP
- MSD (optional)
- Method Blank

Table 1. Quality Control Requirements (Sample Set = 20 samples)

QC Analysis	Required/ Frequency	Limits	Corrective Action	Corrective Action after Reanalyzing
Method (preparation) Blank	Yes One each set	<MDL or 1/10 Regulatory limit	Remove contamination and rerun	Notify client. Flag data.
Laboratory Control Sample (LCS)	Yes One every 20 samples	90%-110%	Rerun	Notify client. Flag data.
Matrix Duplicate	Yes One each set	RPD<20%	Rerun entire set	Notify client. Flag data.
Matrix Spike	Yes One each set	80%-120%	Analyze by Method of Standard Additions	Notify client. Flag data.
Matrix Spike Duplicate	Yes One every 20 samples Level III	80%-120%	Analyze by Method of Standard Additions	Notify client. Flag data.
Dilution & Rerun	No except if result indicates suppressive interference	Does interference persist?	Yes. Rerun with Method of Standard Additions	Notify client. Flag data.

9.0 DOCUMENTATION

9.1 Turbidity Bench Sheet

9.1.1 Analyst
9.1.2 Analysis
9.1.3 Date Run
9.1.4 Detection Limit
9.1.5 Wavelength
9.1.6 Merit #
9.1.7 Dilution
9.1.8 Concentration (FTU)
9.1.9 Result
9.1.10 Spike Concentration
9.1.11 % Recovery
9.1.12 Batch ID

10.0 METHOD PERFORMANCE

10.1 Precision and accuracy studies are performed on as needed basis. (Ex. new instrument, etc.)
10.2 Method Detection limit studies are performed annually.

11.0 REFERENCES

11.1 *EPA Water NPDES*, Method 180.1, EPA Test Methods, Revision 1982, Turbidity (Nephelometric).
11.2 Hach DR/3000 Spectrophotometer Manual.

12.0 SAFETY

12.1 Every Laboratory area has eyewash, emergency shower, and fire extinguisher. The metals lab also has dust masks available for use with dust samples.

12.2 The air system through out the laboratory area is on a 100% fresh air exchange system, this system exchanges 100% the air in the laboratory area with air from outside 6 times per hour and 30 times per hour when the emergency purge button is hit.

12.3 A reference file of material safety data sheets (MSDSs) is available to all personnel.

13.0 WASTE DISPOSAL AND POLLUTION PREVENTION

13.1 All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations.

13.2 Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

14.0 APPROVAL & ISSUE

14.1 This section indicates which personnel have read, accepted and approved the SOP. All analysts involved with the SOP must acknowledge their comprehension of the SOP with a signature and a date.

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Analyst Date

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Andy Ball, QA Officer Date

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Maya V. Murshak, Technical Director Date